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Dear Chip and Tara,

This letter provides NOAA's comments on the draft **Portland Harbor RI/FS Programmatic Work Plan**. The document is dated March 31, 2003. Thank you for allowing me to submit my comments late and to review the draft compiled comments. Reading the comments of the other reviewers significantly shortened my comment letter, since others have already addressed many of my concerns. The comments below are intended to supplement the current draft comments; they address issues that were not identified or emphasized by the other reviewers.

General Comments:

Throughout the workplan and appendices, there are references to the tissue sampling that was performed in 2002. These references invariably convey a sense of completeness, leaving the reader with the impression that all of the tissue collection needs for the project have been met. We disagree. In particular, we are concerned about the lack of clam and benthic invertebrate tissue chemistry. The workplan implies, but does not directly state, that Biota Sediment Accumulation Factors (BSAFs) will be developed from the existing data. We certainly hope the LWG will not try to develop any sort of relationship from the two available co-located clam and sediment samples (although two points would certainly generate a nice tidy line). Lack of data with which to generate BSAFs is a significant data gap that the workplan should address directly. The LWG should consider in-situ tests (bagged mussels or clams), laboratory bioaccumulation tests, or other methods to fill this data gap if sufficient tissue cannot be obtained from the field.

The workplan relies too heavily on post-ROD sampling that will be done "by other parties" as part of "remedial design sampling." EPA and the LWG need to discuss this issue and

reach a common understanding on the precision of the site characterization required of the LWG under the AOC. We understand that the LWG has not signed up to perform remedial actions under the current AOC. We agree that the parties ultimately performing the cleanup work will probably want to perform additional sampling to determine the precise volume of sediment requiring remedial action. We are concerned that the level of effort envisioned by the LWG will not produce sufficient information to allow EPA to write solid, defensible cleanup orders. This is a legal question as well as a technical one and it is critical to the success of the project.

Why is a preliminary risk evaluation proposed for ecological risk but not for the human health risk? The workplan should explain why the difference in approaches are appropriate and list the goals and objectives of the ecological preliminary risk evaluation.

There are references to "background" throughout the document, but there is no systematic approach to defining background conditions. This is always a sticky issue at Superfund sites and given the dynamic nature of the Willamette, defining background conditions may be particularly difficult, requiring multiple rounds of sampling. The workplan should identify "background conditions" as a data gap and lay out a clear plan of sampling and analysis to address this data gap.

The workplan asserts in several places (see Attachment 1 to Appendix A, for example), that Remedial Action Objectives must be below background. We agree that is it is not possible to clean below naturally-occurring concentrations of metals. However, it is possible to clean below the background concentrations of anthropogenic chemicals. If background levels of anthropogenic chemicals are posing an unacceptable risk to human health or the environment, and if recontamination from upstream is unlikely, then EPA can require cleanup below background.

We are skeptical about the feasibility of natural attenuation. The LWG's own analysis indicates that in many parts of the river, the surface sediments are more contaminated than the subsurface sediments, which is hardly an ideal scenario for natural attenuation. The LWG has also shown the river to be a highly dynamic environment, with regular movement of sediment through the system, even in a fairly low water year. The river supports large boat and barge traffic, which generates considerable wakes. We are not ruling out natural attenuation, but we wanted to warn the LWG that we think natural attenuation may have limited utility. All areas selected for natural attenuation must undergo confirmation sampling to ensure that recovery is occurring as predicted.

Specific Comments:

Section 4.1.2, page 53. The text here says that in assessing the historic bioassay data, "data comparability among benthic data sets was used as an additional QA/QC criterion." This should be described in much more detail, especially if this "data comparability" criterion" was used to eliminate any data.

Section 6.2.2, page 94. The text here says "decisions regarding cleanup in the ROD will take into account any necessary source control actions to ensure long-term effectiveness." Ideally, source control actions would be completed before the ROD.

Section 6.2.2, page 95. The text here calls for a process to allow maintenance dredging to occur without being impeded by the ROD. This issue is already addressed in an EPA / Corps of Engineers agreement and does not need to be addressed in the workplan. Also, the LWG should understand that the ROD might indeed impede maintenance dredging or other development work. If capping or natural attenuation is selected, institutional controls will be included in the ROD to ensure these remedies remain effective over time. We expect the LWG to consider potential negative impacts on future development during the feasibility process.

Section 7.2.3, page 117. The bulleted list of scenarios where groundwater discharging to the river could be a problem should include direct toxicity to amphibians and fish, particularly in more quiescent areas of the site.

Section 8.7.4, page 145. The bulleted list of data to be considered in the recontamination evaluation should include an assessment of the chemical concentrations of likely sources of sediment to the river. Sediment traps will tell us what is entering this river this year, but we also need to predict what will enter the river during high water years. The hydrodynamic modeling will show us where the sediments entering the site come from; we may need to sample the significant sediment source areas in order to understand the likely inputs to the site.

Table 7-3, Step 4. "Subsurface sediment is defined as sediment from 30 cm below the mudline to native layers." Contamination does not necessarily stop when it hits a native surface – this is particularly true for DNAPL. The text here should define subsurface as anything deeper than 30 cm.

Table 7-3, Step 5. "Historic data for each chemical are acceptable when they are within the same range of concentrations over time ..." This is so vague that it is meaningless. What "range" does the LWG have in mind, and over what time are concentrations expected to remain stable?

Table 7-4, Step 6. Surface water sampling should capture low flow and high flow conditions, as the LWG points out here. But additional sampling may be needed to capture seasonal changes in water quality, such as pesticide runoff.

Table 8-2. Mixed Layer Depth is listed as a data gap here, but elsewhere in the workplan, the SPI and bathymetric change data are used to support a mixed layer depth of one foot across the site. Does the LWG intend to conduct further work to refine the mixed layer depth?

Appendix A, Attachment 1, Table 2, ARARs. The Flood Insurance Act may be an ARAR. This program provides federal flood insurance to the City of Portland and requires that the City not allow fill in the river that would cause in increase is the flood rise. This may limit the size and locations of caps in the river.

Appendix A, Attachment 2, section 4, page 9. The upstream limit in the Columbia River should be extended east of the Cascade mountain range. Landfills located east of the Cascade mountain range have been known to accept contaminated sediments for disposal with little or no de-watering. This may significantly reduce disposal costs. The downstream limit in the Columbia should also be extended due to the relatively low costs associated with barge transport.

Appendix A, Attachment 2, section 4, page 10. It is unclear why a one-mile distance from the river's edge has been selected for the location of new upland disposal sites. A more reasonable distance of 10 miles should be provided.

Appendix A, Attachment 2, Section 6, Page 12. Preliminary screening should be based on a weight of evidence approach. No one criteria should be used to eliminate a potential disposal site from further consideration. Instead, potential disposal sites should be evaluated against all criteria and then ranked.

Appendix A, Attachment 2, Figures 1 and 2, pages 7 and 8. Information obtained to support the FS may affect the final site ranking. As a result, the flow charts depicted in Figures 1 and 2 should include a process for feeding FS information back into the final site ranking process. In addition, Figure 1 should recognize that additional sampling activities to support the FS may be required.

Appendix A, Attachment 3, Section 1, page 1. In some cases, material which is deemed clean enough for open water disposal may exceed risk based cleanup levels developed for Portland Harbor. Capping material should meet Portland Harbor risk based goals or DMMP levels, whichever are lower.

Appendix A, Attachment 3, Section 2.1.2, page 4. Though typically smaller in volume, the attachment should acknowledge that private maintenance dredging activities may also be a source of capping material.

Appendix A, Attachment 4, Section 2, page 3. Included in natural attenuation processes are "Diffusion/advection of chemicals to the water column (i.e., loss to the water column)" and "Transport (erosion) of sediments containing chemicals and dispersion over wider areas at lower concentrations." The document should acknowledge that these may be highly undesirable processes because they can cause direct risk and spread contamination over a large area.

Appendix A, Attachment 4, Section 2.3, page 6. The sedimentation rate will be very difficult to estimate, due to the dynamic nature of the river. The LWG should include sensitivity

analyses early in the modeling efforts to determine how inaccurate sedimentation rates will effect the outcome.

Appendix A, Attachment 4, Section 2.3, page 7. This is the fist time the LWG has suggested the Boudreau model. EPA should not approve the use of the Boudreau model at this time. We need more time to evaluate this model and discuss model inputs with the LWG.

Appendix A, Attachment 4, Section 3.7, page 11. This section lists the velocity of groundwater as a data gap. Measuring the velocity of groundwater in nearshore areas with tidal pumping is very difficult. Both the direction and rate of groundwater movement can change over the course of a day.

Section 5.0, Figure 5-1. Please add "and porewater" to the "sediment" boxes.

Section 5.0, Figure 5-3, Preliminary Ecological Conceptual Site Model. The boxes for Direct Contact / Uptake of Porewater for infauna and mollusks should be complete and major. The box for direct contact of porewater with lamprey should be complete and uncertain – according to the text, lamprey "live in direct contact with sediment." The box for ingestion of surface water for lamprey should be complete and uncertain; their feeding strategy necessitates the ingestion of surface water.

Section 5.0, Figure 5-4. The shaded boxes "contain receptors assessed for risk" but the boxes for infaunal invertebrates and epibenthic invertebrates are not shaded. They should be – they are receptors, at least at the community level.

Section 6.0, Figure 6-1. The milestones and schedule seem overly ambitious. For example, the Draft Baseline Risk Assessments and the RI Report are due to EPA in 2Q 2004, which is just 9 months, at the most, after the completion of the Round 2 field work. The round 1 field work was completed 9 months ago, and we don't have a complete data report, let alone any data interpretation. Similarly, Round 3 data collection is scheduled to be completed in 4Q 2004, just six months after the draft baseline risk assessment report is due, and there is no room in the schedule for a Round 3 FSP and QAPP. We support moving forward smartly, but are concerned that this tight timeline may not be realistic. Also, we note that "Allocation / Cash Out" is listed as an element of the ROD. This has not been discussed previously, and we don't see any sampling planned to address this issue, such as PAH fingerprinting. If this is an agreed goal for the ROD, this issue needs to be addressed more explicitly in the workplan.

Section 6.0, Figure 6-3. Establishment of background conditions should be included in this figure. Also, what is a Remedial Action CSM?

Comments on Appendix C

Section 2.1.3.2, Measures of Ecological Effects. The measures here are the same as the assessment endpoints, with "effects on" tacked on the front of each one. The measures

should be more specific than the assessment endpoints. Also, the workplan should include the specific testable hypotheses that will be used to determine whether there are effects for each of the listed measures.

Section 2.2.1, Open-Water Habitat, page 15. The text here identifies three types of habitat – sediments deeper than –20 CRD, sediments above –20 CRD, and developed shorelines. This is too simplistic. The plan should recognize that depth is not the only thing that defines habitat – flow, sediment stability and grain size are additional factors that define suitable habitat for benthic organisms.

Section 2.2.1, page 15. "Conversely, exposed nearshore areas, particularly around berths, docks, and boat ramps, likely have limited benthic communities controlled by physical disturbance factors." This is not supported by the SPI data. Figure 3-4 of the SPI report shows stage three infaunal communities at Oregon Steel Mills, T4 Slip 3, U.S. Moorings, in the shipyard, and in Swan Island Lagoon.

Section 2.5.2. This section lumps bivalves in with Epibenthic and Infaunal Invertebrates. This is inappropriate. Shellfish should be assessed separately, as they are uniquely sensitive to TBT.

Section 2.5.3.3, page 52. "...one fish was captured 21 miles from the release site and several fish were not recaptured and may have moved long distances" An equally likely explanation is that the fish were eaten by predators.

Section 2.5.4, page 52. "Representative amphibian species have not been evaluated yet because their presence in the ISA was only recently confirmed." This is outrageous – even a cursory review of the literature would have confirmed the presence of salamanders and frogs in the lower Willamette.

Section 4.0, bottom of page 67 and top of page 68. The LWG proposes to identify COPCs for fish, birds, and mammals in the PRE. But the PRE will be conducted before the Round 2 data is collected, so we won't have any water column data. COPCs cannot be eliminated without considering all three major pathways of exposure (sediment, prey, and water). This is especially important for contaminants like PAHs and some metals that do not bioaccumulate. These contaminants could be causing risk, but will not show up in the tissue samples. Therefore, they cannot be completely eliminated in the PRE.

Section 5.1, equation 2, page 72. "m = mean of the transformed data." Please clarify if this is a simple log transformation or something else.

Section 5.1, page 72. "Risks to ecological receptors from exposure to PCBs will be assessed by comparing medium (*sic*) concentration of specific Aroclors to that specific Aroclor toxicity value ..." First, should this say "median" or "mean?" Second, NO, this is unacceptable. For all other contaminants, the proposal is to use the 95% UCL; the same

approach should be used for PCBs. Third, this assumes only individual Arochlor assessments; we may also want to consider the effects of total PCBs.

Section 5.3, Assessment Endpoint 3, page 77. The text here describes the LWG's plan to develop tissue based TRVs for non-metabolized chemicals and dietary TRVs for metabolized chemicals. If there is sufficient literature data available, TRVs should be developed for all pathways (*e.g.*, uptake from water column, dietary exposure, direct exposure to sediment), and the resulting information used in a weight of evidence analysis.

Section 5.3, page 79, bottom of page. "The results of this stomach screening will not be used for any quantitative purpose in the PRE or BERA." Why not? It seems reasonable to use this information in the food web modeling, for example. Smallmouth bass do not appear to be eating fish, and could be removed from the "piscivore" category. This is useful information that should not be ignored in the risk assessment.

Section 5.3, page 82, bottom of page.

Figure 5-2. First, what is the scale across the top of this figure – miles? It is interesting to see the maximum recapture distance, but the report should also discuss the home range that will be used in the risk assessment. Using the maximum of the available information is not conservative and should not be accepted for use in the PRE.

Figure 3-1. This figure should indicate how a "hit" was determined. As determined by the study author? By following the DMEF rules? By comparing to the laboratory control?

Table 2-2. The references at the bottom of this table do not all appear in the reference list. We could not find Busby et al. 1996 or Carl 1936 in the reference list.

Attachment C1, Aquatic Plant and Amphibian /Reptile Reconnaissance Survey, Section 2.0, page 2. The objective of the survey was to find evidence of amphibians, but it apparently did not include salamanders.

Attachment C5, Fish TRV Selection, Literature Search Process, page 29. Behavioral studies need to be included in the list with growth, mortality, and reproduction. Fish survival and reproduction depend on their behavior (Shumway 1999). Behavior is an important sub-lethal effect for a number of contaminants and has been used routinely in mammalian toxicology for years. Only immune system and endocrine disruption effects should be listed as alternative endpoints. The trustees may want to consider immune system and endocrine disruption effects in the NRDA, so the LWG should consider including these types of effects in the literature searches.

Attachment C5, Fish TRV Selection Study Screening, page 30. We recognize that study screening was discussed during meetings between EPA and the LWG, and that at the time, we agreed to a process to prioritize (not screen out) studies. On further reflection, we have come to the conclusion that the screening steps listed on page 30 and 31 should be

eliminated. If there were hundreds, even tens of studies that looked at the effects of various chemicals on fish, then the screening process proposed by the LWG would be entirely appropriate. However, we believe that the available toxicity data for any single contaminant is very limited. This is a particularly true of tissue residue data. The limited literature containing tissue residue effects data encompasses a wide diversity of experimental approaches, including dosing frequency and duration, life stages exposed, design, contaminant form etc. Trying to prioritize papers based on one specific experimental design or group of design features is not a good approach.
The goal of study screening and selection should be to identify the most protective tissue concentrations from the available literature. Given the paucity of available studies, the study screening as proposed will not assist in selecting a protective number. The steps listed to prioritize the literature are not a useful way to assess the quality of the study, or compare quality across studies. In lieu of the proposed approach, NOAA would like the LWG to use the following simplified approach. Studies with growth, mortality, reproduction/development, and behavioral effects should be reviewed that have:

1) either a food and/or water exposure to any form of a CoC;
2) report both a no-effect and an effect concentration, as there is no way to interpret unbounded effects data, and
3) the effect should be correlated with a single contaminant, although the exposure may be to more than one.

This will result in a limited data set from which protective numbers can be selected. The final selection could be narrowed based on the species and/or contaminant form. However, trying to match species has limited value when the experimental design differences probably outweigh interspecies differences.

I apologize for being so late with my comments. If you have questions about these comments, I would be happy to discuss them with you.

Sincerely,

Helen E Hillman

Helen Hillman

Shumway, C. A. 1999. A neglected science: applying behavior to aquatic conservation. *Environmental Biology of Fishes* 55(1-2): 183-201.

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